Translation

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PATENT COOPERATION TREATY

PCT/EP2003/050801

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 62909	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2003/050801	International filing date (*day/month/year*) 07 novembre 2003 (07.11.2003)	Priority date (*day/month/year*) 12 novembre 2002 (12.11.2002)
International Patent Classification (IPC) or national classification and IPC H03B 15/00		
Applicant THALES		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
07 juin 2004 (07.06.2004)	05 October 2004 (05.10.2004)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/EP2003/050801

I. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-19, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims:

pages 1-19, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the drawings:

pages 1-7, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/EP 03/50801

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-19	YES
	Claims		NO
Inventive step (IS)	Claims	1-19	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-19	YES
	Claims		NO

2. Citations and explanations

Technical field

The invention relates to a device for reducing the phase jitter of a signal from a quasi-periodic source of fundamental frequency f_0.

Prior art

D1 (WO 02/065631) discloses an oscillator that includes a feedback system for reducing phase jitter, including a phase-shift filter and a feedback loop.

Problem

Reducing the short-term phase jitter of the quasi-periodic signal.

Solution

The phase jitter reduction device includes a physical system for transmitting pulses by quasi-particle transfer, in particular fluxons, in a Josephson transmission line, wherein said quasi-particles have a mutually repulsive interaction. Said physical system is defined as having a characteristic frequency f_c, which defines an operating frequency range of the device with a low limit associated with said characteristic frequency. In response to the quasi-periodic signal input, said physical system outputs

pulses at fundamental frequency f_0.

Novelty and inventive step

None of the documents cited in the international search report discloses or suggests a device that uses such a physical system for transmitting pulses by particle transfer to reduce phase jitter.

D2 (the article by Kaplunenko in Appl. Phys. Lett. 66(24), 1995, 3365 to 3367) describes a superconductor circuit with a Josephson transmission line wherein two fluxons generated by inputting two pulses propagate along said line. A repulsive interaction between the fluxons can lead to spatial redistribution within the line, resulting in a difference between the time interval separating the two pulses at the output and that observed at the line input. To avoid this problem of interaction, D2 recommends sizing the line so that the time separation between two fluxons is not less than $3f_c^{-1}$. D2 neither discloses nor suggests the use of a Josephson transmission line for filtering the white noise of a signal from a quasi-periodic source.

D3 (US 5,963,351 A) discloses a clock recovery circuit including at least one Josephson transmission line. Nothing is said in D3 about white noise and the reduction thereof.

D4 (EP 0467104 A) discloses an electronic clock that includes a Josephson junction in parallel to a resonant circuit including a Josephson transmission line. To reduce phase jitter, D4 proposes the use of a phase-locking circuit, which has nothing to do with the quasi-particle transmission of the present application.

The other documents cited in the international search report are even more remote from the device defined in claim 1.

Consequently, the subject matter of claim 1 is novel and

involves an inventive step relative to the documents cited. Claims 2 to 19 also meet the requirements of PCT Article 33, since they are dependent on claim 1.

Observations with regard to clarity (PCT Article 6)

1. The fundamental frequency f_0 is not clearly included in the definition of the operating frequency range (cf. claim 1). It is therefore not clear whether the expressions "operating frequency" and "fundamental frequency" are equal or not. Consequently, the upper limit of the frequency range is not defined in claim 1, contrary to the requirement of PCT Article 6 (cf. page 8, lines 30 to 33 of the description).

2. The expression "particle transfer" in claim 1 is not supported by the description, wherein only transfers of quasi-particles are disclosed (flux quanta, vortices, etc.).